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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/550,800

10/28/2005

Keiji Nagai

125024

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ALEXANDRIA, VA 22320-4850

EXAMINER

BERMAN, JACK I

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/550,800	<b>Applicant(s)</b> NAGAI ET AL.	
	<b>Examiner</b> Jack I. Berman	<b>Art Unit</b> 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 3-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-14 is/are allowed.
- 6) ☒ Claim(s) 3-10 and 15-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/23/08</u> .   | 6) <input type="checkbox"/> Other: _____                          |

Applicant's election with traverse of Group I in the reply filed on February 20, 2008 is acknowledged. The traversal is on the ground(s) that the examiner did not use the rules of practice in PCT national phase applications. Applicant is correct and the examiner apologizes for using the wrong set of rules.

The requirement is deemed improper and is therefore withdrawn. Examination of all the claims follows.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 7 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 7 claims the extreme ultraviolet light source target according to claim 3, wherein the extreme ultraviolet light source target is made of frost of a gas target having a density 0.5 to 80% that of a solid of the gas target, but claim 3 claims an extreme ultraviolet light source target wherein the extreme ultraviolet light source target is made of heavy metal or heavy-metal compound, and a density of the heavy metal or the heavy-metal compound is 0.5% to 80% of a crystal density of the heavy metal or the heavy-metal compound. If a gas, i.e. a vapor, of a heavy metal were frozen, it would inherently condense into the solid, crystal form of the metal with 100% of its crystal density. The embodiment of the invention wherein the frost of a gas is used as the target is described in the specification at line 22 on page 6 through line 10 on page 7 with xenon, hydrogen, oxygen,

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nitrogen, argon, krypton, and their mixture with hydrogen or helium given as examples of acceptable gases to be frozen. None of these are heavy metals or heavy metal compounds and there is no suggestion in the original disclosure that heavy metals or heavy metal compounds would be suitable for this embodiment.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3-10 and 15-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. All these claims use the term “crystal density”, which is not a standard term in the art. In the remarks filed on February 20, 2008, applicant defines this term as the density of the crystal structure of the heavy metal or heavy metal compound under normal conditions (i.e. normal temperatures and normal pressures), which the examiner interprets to mean room temperature and atmospheric pressure. Since this is not a standard term in the art, it must be defined.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3-6, 8-10, and 18 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Choi et al. As was explained in the previous Office action, Choi et al. discloses a laser plasma soft x-ray source (i.e. an extreme ultraviolet light source, since x-rays produced by plasma resulting from the irradiation of a target by a laser instead of electron beam irradiation of an anode are usually called extreme ultraviolet even though the wavelengths produced overlap the x-ray range) that comprises a target that is, in the embodiment discussed at lines 4-7 in the right-hand column on page 1617, a powder of SnO and SnO<sub>2</sub> glued onto a tape and compressed by hand. Such a target inherently includes voids because a human hand is incapable of exerting enough force to eliminate all the voids between the powder particles. As is illustrated in Fig. 1, this target is irradiated by a YAG laser. Applicant argues that Choi et al. does not anticipate the claimed invention since Choi fails to disclose that the density of the heavy metal or the heavy-metal compound is 0.5% to 80% of a crystal density of the heavy metal or the heavy-metal compound. This argument is not persuasive because the powder of SnO and SnO<sub>2</sub> glued onto a tape and compressed by hand described by Choi et al. would inherently have a lower density than a solid piece of SnO or SnO<sub>2</sub>. The exact density of

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the target described by Choi et al. is not specified, but since applicant is relying on this characteristic to distinguish over Choi et al., applicant bears the burden of proving that the density of the Choi et al. target is not in the claimed range. See *In re Fitzgerald et al.*, 205 USPQ 594 (CCPA 1980).

Claims 3-5, 15, and 17 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Koplick et al. (U. S. Patent No. 6,355,821). Koplick et al. discloses a method of making a heavy metal oxide layer (lines 10-11 in column 7) comprising manufacturing a gel containing a heavy-metal oxide by solving a heavy-metal chloride in dehydrated alcohol (lines 11-13 in column 7, also note claim 18 of the patent, which states that the alcohol is anhydrous) and mixing this with water (“allow[ing] the film to adsorb moisture and hydrolyse to form a sol-gel”, lines 22-23 in column 7); and a step of drying the gel (baking the glass in lines 24-25). In line 31 in column 8,  $\text{SnCl}_4$  is listed as one of a list of metal chlorides suitable for use in the method. Since this is the same method claimed in claim 15 of the instant application and the process claimed in claim 15 is described in the application as a method of producing the extreme ultraviolet light source target claimed in claims 3-5, the practice of the method disclosed by Koplick et al. using  $\text{SnCl}_4$  in the method would inherently produce the same material claimed in claims 3-5. As is explained above in connection with the rejection of claims 3-6, 8-10, and 18 above over Choi et al., if applicant is relying on the density of the resultant product to distinguish over Koplick et al., applicant bears the burden of proving that the density of the Koplick et al. oxide layer is not in the claimed range. See *In re Fitzgerald et al.*, 205 USPQ 594 (CCPA 1980). The intended use of the material, i.e. its use as a target for producing extreme ultraviolet light, does not define any limitation capable of patentably

distinguishing the material claimed in claims 3-5 or the method claimed in claims 15 and 17 for producing this material from those disclosed by Koplick et al.

Claims 3 and 19 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tillotson et al. (U. S. Patent No. 5,409,683). As was explained in the previous Office action, Tillotson et al. discloses an aerogel body of heavy metal or heavy-metal compound. This body is inherently capable of functioning as an extreme ultraviolet light source target when irradiated by a laser. As is explained above, if applicant is relying on the density of the resultant product to distinguish over Tillotson et al, applicant bears the burden of proving that the density of the Tillotson et al. oxide layer is not in the claimed range. See *In re Fitzgerald et al.*, 205 USPQ 594 (CCPA 1980).

Claims 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koplick et al. as applied to claims 3-5, 15 and 17 above, and further in view of Hornberger et al. (U. S. Patent No. 4,917,960). The invention claimed in claims 16 and 20 differ from that disclosed by Koplick et al., described above, only by the addition of the step of mixing the gel with nanoparticles of polystyrene and heating the gel to a temperature which is 240°C or more but below a decomposition temperature of the heavy-metal oxide. Hornberger et al. teaches, as is best set forth at line 60 in column 4 through line 12 in column 5, to make a composition porous, which inherently decreases its density, by incorporating into the composition particles of a fugitive material, and then raising the temperature of the resultant mixture above the vaporization temperature of the fugitive material but below the decomposition temperature of the composition. At lines 35-49 in column 5, Hornberger et al. teaches that the fugitive material may be a polymer, at line 56 in column 5 that the polymer may be a vinyl, and at line 65 in column 6

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that the vinyl may be polystyrene. It would have been obvious to a person having ordinary skill in the art to decrease the density of Koplick et al.'s metal oxide layer by the method disclosed by Hornberger et al. by mixing polystyrene particles of the type disclosed by Hornberger et al. into the gel described by Koplick et al. and then heating the gel in the manner taught by Hornberger et al. since the Hornberger et al. method can be used to make any composition porous so long as it has a higher decomposition temperature than that of the fugitive material. The size of the particles and the temperature to which the mixture is heated would have been matters of routine experimentation.

Claims 11-14 are allowed for the reasons explained in the previous Office action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack I. Berman whose telephone number is (571) 272-2468. The examiner can normally be reached on Monday-Thursday (8:30-7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jack I. Berman/  
Primary Examiner, Art Unit 2881

jb  
5/22/08